

- [54] BLANK FIRING ADAPTOR FOR GAS OPERATED FIREARM**

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### Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 73,550, Sept. 18, 1970, abandoned.

- [52] **U.S. Cl.**..... **89/14 E**

- [51] Int. Cl. .... F41c 21/18

- [58] **Field of Search** ..... 89/14 R, 14 B, 14 C,  
89/14 D, 14 E, 14 SB

- [56]
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[57] **ABSTRACT**

To adapt a gas operated firearm to fire blank ammunition, a generally cylindrical cap is releasably attached to a firearm muzzle and provides a muzzle gas trap including a metering orifice restriction for effecting operation of the firearm. The metering orifice restriction is aligned with a bore of the firearm muzzle, when the cap is attached, and is in communication with a passage in the cap having an opening generally equal to but slightly larger than that of the firearm bore. The cap has an enlarged debris collection compartment formed therein to surround the metering orifice restriction.

**23 Claims, 7 Drawing Figures**

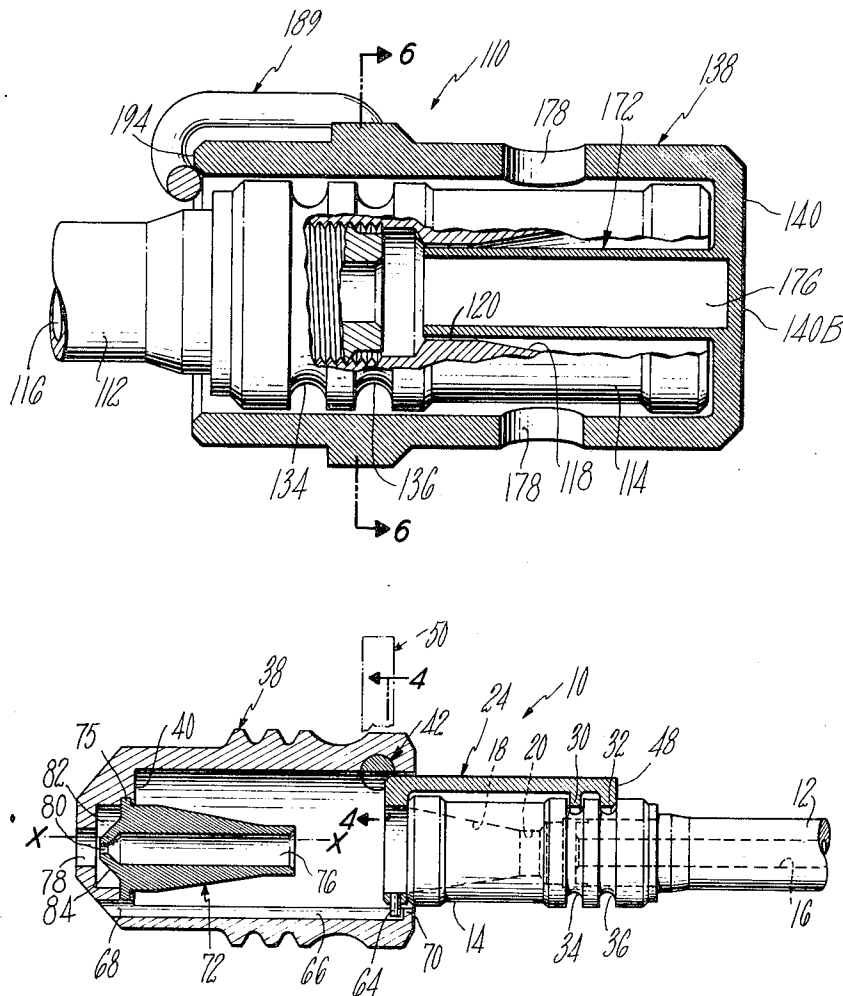


FIG. 1

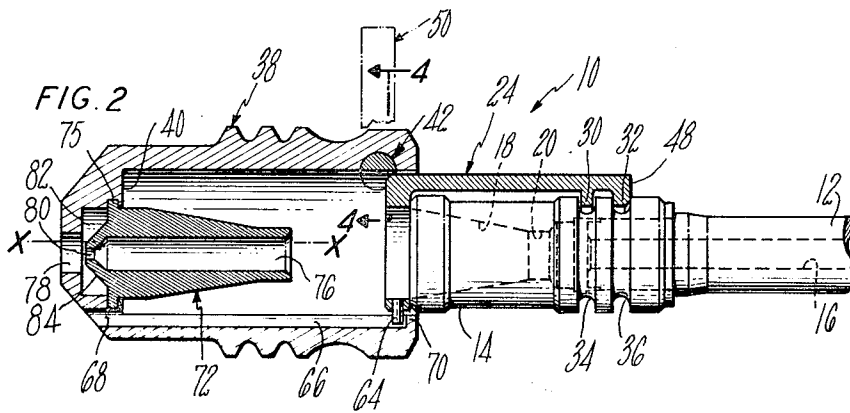
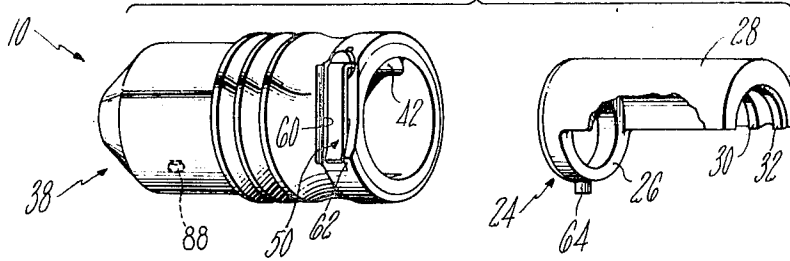


FIG. 3

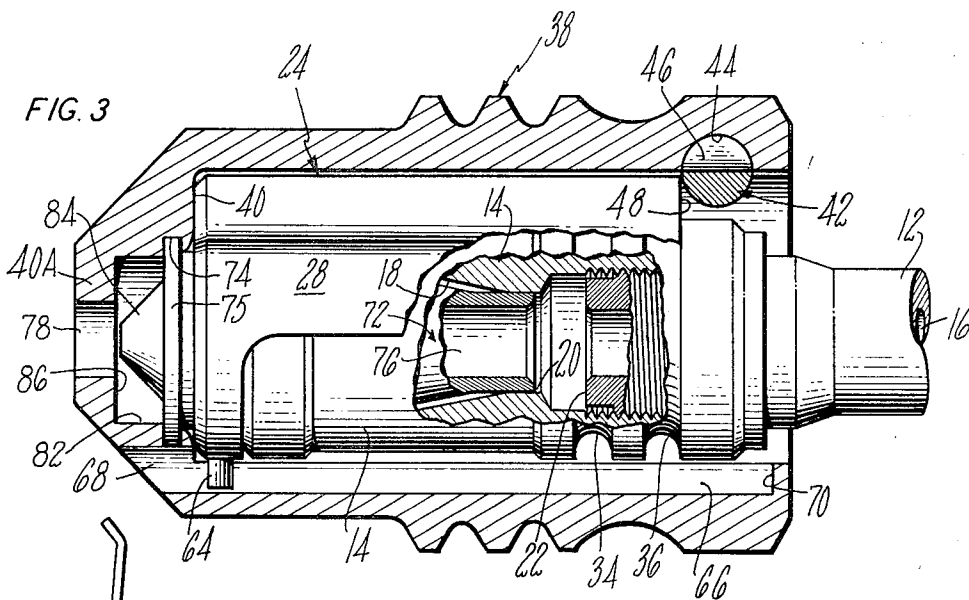
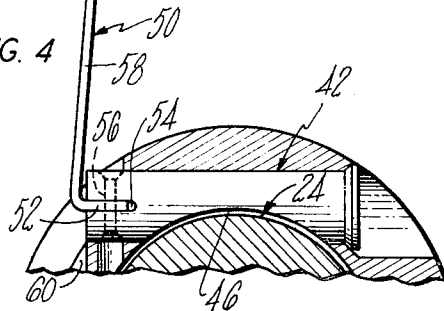
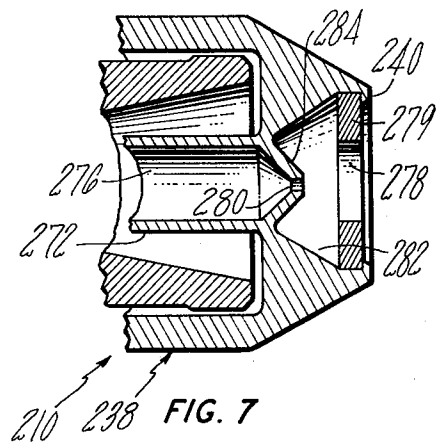
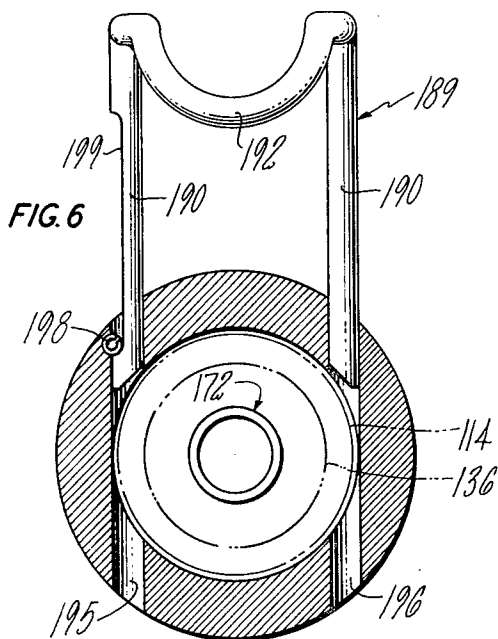
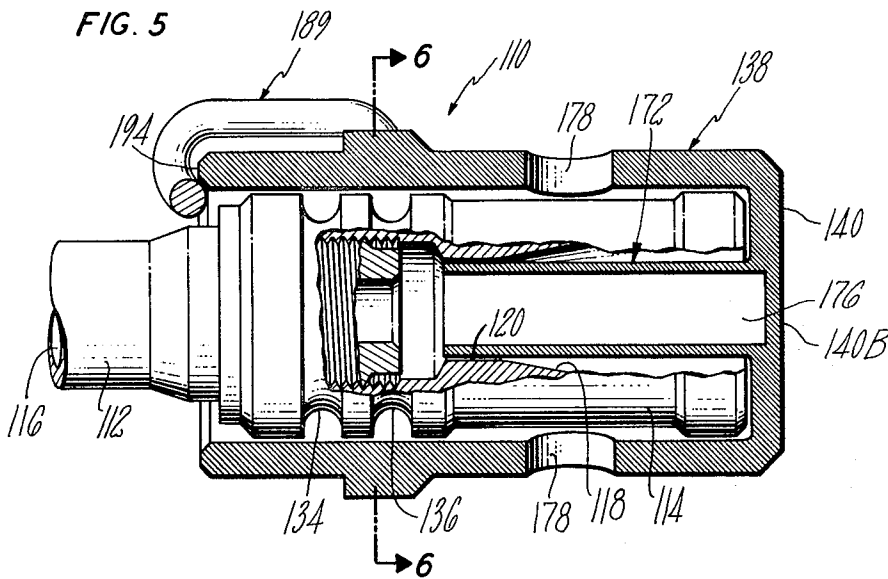


FIG. 4



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# BLANK FIRING ADAPTOR FOR GAS OPERATED FIREARM

This application is a continuation-in-part of my U.S. Pat. application Ser. No. 73,550 entitled "Blank Firing Adaptor for Gas Operated Firearm," filed Sept. 18, 1970 and assigned to the assignee of this invention but now abandoned.

This invention generally relates to gas operated firearms and particularly concerns blank firing adaptors for such weapons.

A primary object of this invention is to provide a new and improved blank firing adaptor for a gas operated firearm which is particularly suited for facile attachment to and removal from the firearm.

Another object is to provide a new and improved blank firing adaptor which not only serves to function the weapon upon the firing of blank rounds but also permits repeated firing of blank rounds without damaging or undesirably affecting either the firearm barrel or the blank firing adaptor.

A further object is to provide a new and improved blank firing adaptor which significantly reduces any possibility of injury due to hazardous debris being sprayed from the weapon upon accidentally firing a live round through the adaptor.

Still another object is to provide a new and improved blank firing adaptor characterized by a compact, lightweight but rugged construction featuring a minimum number of different parts readily accessible for easy cleaning and which provides desired effects of realistic weapon recoil, muzzle flash and sound in simulating live firing.

A still further object is to provide a new and improved blank firing adaptor having a significantly simplified construction readily manufactured at low cost and exhibiting quick-connect and quick-disconnect characteristics and which prevents the gases of combustion from being vented forwardly to minimize a so-called "torch effect" when used in training exercises.

Other objects will be in part obvious and in part pointed out in more detail hereinafter.

A better understanding of the objects, advantages, features, properties and relationships of the invention will be obtained from the following detailed description and the accompanying drawings which set forth certain illustrative embodiments and are indicative of the various ways in which the principles of the invention are employed.

In the drawings:

FIG. 1 is an isometric view, partly broken away, showing a blank firing adaptor of a type incorporating this invention in disassembled relation;

FIG. 2 is an enlarged side view, partly in section and partly broken away, showing the adaptor of FIG. 1, in extended unlocked assembled relation to a muzzle of a firearm barrel;

FIG. 3 is a further enlarged side view, partly in section and partly broken away, showing the adaptor of FIG. 1 in locked telescoped assembly to the muzzle of the firearm barrel;

FIG. 4 is an enlarged section view, partly broken away, taken generally along line 4—4 of FIG. 2;

FIG. 5 is a side view, partly in section and partly broken away, showing another embodiment of an adaptor of this invention in locked telescoped assembly with a muzzle of a firearm barrel;

FIG. 6 is a cross sectional view taken generally along line 6—6 of FIG. 5 and showing the adaptor in a release position; and

FIG. 7 is a fragmentary section view of still another embodiment of a blank firing adaptor incorporating this invention.

Referring in detail to FIGS. 1—4 of the drawings wherein one embodiment of a blank firing adaptor 10 incorporating this invention is illustrated, a barrel 12 of a suitable gas operated firearm such as that of a rifle, e.g., is shown. A muzzle of the barrel 12 is shown including an extension sleeve 14 which for illustrative purposes is shown in the form of a conventional flash suppressor threadably secured to the barrel 12. The barrel 12 has an axially extending bore 16, the muzzle end of which communicates with an opening 18 concentric to the bore 16 and which is shown as being tapered from its discharge end toward the bore 16 to a necked-down throat 20 positioned in adjacent but axially forwardly spaced relation to the front end 22 of the barrel 12. The throat 20 of the opening 18 is slightly larger in diameter than that of the bore 16.

As is well known, conventional rifles (as well as other firearms with which the adaptor 10 of this invention may be used) frequently employ a gas system to feed back gases developed upon the firing of ammunition to provide an energizing force for driving an operating member, not shown, rearwardly to effect a number of functions such as bolt unlocking, hammer cocking, and cartridge extraction and ejection. It will be understood that it is highly important that such a firearm functions within its proper cyclic rate range to preclude malfunctions and parts breakage due to short recoil or, on the other hand, excessive velocities of the recoiling parts.

In accordance with this invention, the blank firing adaptor 10 is particularly suited not only to realistically simulate the firing of live rounds when blank ammunition is being used in a gas operated firearm but to additionally function such a firearm within its proper cyclic rate range in both automatic and semiautomatic modes of fire. Moreover, the blank firing adaptor 10 of this invention is specifically designed to provide quick and easy one-handed installation on and removal from the firearm with which it is to be used in addition to providing an improved safety feature in significantly reducing any possibility of hazardous debris being discharged upon accidental firing of a live round through the adaptor, while also minimizing any possibility of damaging the firearm to which the adaptor is attached.

More specifically, the blank firing adaptor includes an open-ended fitting 24 preferably formed of a rugged, heat-resistant material such as steel having an annular end wall 26 and an arcuate, parti-circular side wall 28 shown extending rearwardly from an upper segment of the annular end wall 26. A rear portion of the side wall 28 includes a pair of radial locking lugs 30, 32 projecting inwardly for engagement within a pair of grooves 34, 36 circumferentially extending about the extension sleeve 14 for positioning the annular end wall 26 of the fitting 24 adjacent the front end of the sleeve 14 in concentric conforming alignment with its enlarged end opening while also securing the fitting 24 against unintended longitudinal movement relative to the muzzle of the barrel 12.

A generally cylindrical gas metering cap 38, preferably formed of a durable, rugged lightweight material such as aluminum, is shown having an open end

adapted to be fitted. over the end wall 26 of the fitting 24 and slidably moved rearwardly to a telescoped assembled position shown in FIG. 3 wherein an end wall 40 of the cap 38 is in abutment with the end wall 26 of the fitting 24.

To provide a manually releasable quick disconnect locking device for maintaining the cap 38 in telescoped assembly with the fitting 24, this invention makes use of a cross pin 42 carried in an opening 44 extending laterally through a rear portion of the cap 38. The pin 42 has a reduced cross sectional portion 46 formed between its ends providing an arcuate segment in the cross pin 42 conforming to the outer surface of the fitting 24 to permit the cap 38 to be freely slidably moved longitudinally of the fitting 24 when the pin 42 is in a release position best seen in FIGS. 2 and 4. The cap 38 is shown having a length somewhat greater than that of the fitting 24 such that upon being moved into telescoped assembled position, the cross pin 42 is conveniently positioned rearwardly of a radial shoulder 48 formed by the rear end of the fitting 24. When so assembled and upon rotating the cross pin 180° from its release position shown in FIG. 4, the pin 42 will be in interference with the shoulder 48 and physically block forward movement of the cap 38 and thereby secure the cap 38 and fitting 24 against longitudinal movement relative to the barrel 12. Frictional engagement between the fitting 24 and the extension sleeve 14 serves to minimize any relative rotary movement therebetween.

To facilitate facile locking and unlocking of the fitting 24 and cap 38 in telescoped assembly, a spring lever 50 of generally L-shaped configuration is provided with an apertured finger 52 shown received within a slot 54 formed in an end portion of the cross pin 42 and suitably fixed by a staked fastener 56. The lever 50 has an elongated arm 58 integrally formed with the finger 52 to extend in generally perpendicular relation thereto for quick and easy angular positioning of the cross pin 42 for selectively locking and releasing the cap 38 relative to the fitting 24. The elongated arm 58 is shown in locked position in FIGS. 1 and 3 secured against inadvertent displacement between a pair of radially projecting, spaced apart ribs 60, 62 whereby the arm 58 must be intentionally cammed over the ribs 60 or 62 and rotated 180° from its locked position to its aforementioned release position wherein the cross pin 42 does not interfere with the fitting 24. The arm 58 is shown having a free end conveniently offset to extend upwardly for quick and easy manipulation which may be readily accomplished even with a bullet end of a cartridge in the event the blank firing adaptor 10 were to become extremely hot after repeated firing.

To easily position the cross pin 42 in operative angular alignment with the shoulder 48 of the fitting 24, a pin 64 is shown projecting downwardly from a lower portion of the end wall 26 of the fitting 24 for receipt in a longitudinally ending guide slot in an exterior side wall surface of the cap 38. The guide slot 66 is shown extending through the end wall 40 of the cap 38 to provide an orifice 68 therein, and terminates at its opposite end adjacent a shoulder 70 formed in the cap 38 serving as a stop for the pin 64. Such construction has the advantage of permitting the cap 38 and fitting 24 to be installed on the muzzle of the barrel 12 as a unit when in extended, unlocked assembly as shown in FIG. 2 to automatically locate the fitting 24 longitudinally on the

barrel muzzle. It will be understood that sufficient clearance is provided between the fitting 24 and cap 38 to permit their being readily disassembled if desired, e.g., for cleaning. While not shown, the guide slot 66 and pin 64 could be eliminated, and the disclosed offset mounting of an elongated plug 72, hereinafter fully described, in eccentric fixed relation to a major longitudinal axis X—X of the cap 38 will serve to automatically align and locate the cap 38 relative to its fitting 24, upon receipt of the plug 72 within the extension sleeve opening 18, with the cross pin 42 automatically located behind the shoulder 48 of the fitting 24. The fitting 24 is of extended arcuate length, approximately 180°, and is continuously maintained in locking engagement with the cap 38 due to the tight fitting engagement with its cross pin 42 upon the same being rotated into locked position.

To properly energize a gas operated firearm such as a rifle while at the same time minimizing the discharge of any particulate fragments upon accidental firing of a live round through the adaptor 10, the plug 72, formed of a suitable heat resistant, rugged, frangible material such as steel, is fitted in a counterbored opening 74 in the end wall 40 of the cap 38. The plug 72 is suitably secured in position, e.g., by staking a radial shoulder 75 of the plug 72 in place, so that an axially extending passage 76 in the plug 72 will be disposed generally in coaxial alignment with the extension sleeve opening 18 and the rifle bore 16, as well as with an opening 78 in the end wall 40 of the cap 38. The latter is formed in concentric alignment with the counterbored opening 74 of the cap 38 and has a diameter approximately equal to that of the passageway 76 in the plug 72. The plug passageway 76 thus serves in part to define a passage extending through the cap 38 which is of a size greater than that of the rifle bore 16 and which terminates in the opening 78 in the end wall 40 of the cap 38.

The rear body portion of the plug 72 is dimensioned and configured to taper rearwardly from the end wall 40 of the cap 38 so as to be received in intimate sealing engagement with the wall of the extension sleeve opening 18 to provide a relatively tight gas seal about the throat 20. To properly energize the gas system to function the gas operated rifle while also effecting relatively fast gas release for desired cooling and reduced powder fouling, a forward end of the plug 72 is formed with an opening of a predetermined reduced size to serve as a metering orifice restriction 80 suitable for functioning the rifle within its proper cyclic rate range in both automatic and semiautomatic modes of fire while yet permitting direct bleed-off of gases to atmosphere developed upon firing blank ammunition.

To minimize any possibility of damage to both the muzzle of the rifle barrel 12 and to the adaptor 10 during normal use, and to additionally confine any particulate fragments of the adaptor 10 from being randomly sprayed in a lethal manner upon accidental firing of a live round through the passage of the cap 38, the plug 72 is longitudinally dimensioned such that its rear end portion will be seated within the throat 20 of the opening 18 in adjacent but axially forwardly spaced relation to the muzzle of the rifle barrel 12, and a radially enlarged debris collection compartment 82 is formed within the cap 38 adjacent the metering orifice restriction 80 in communication with the passage 76, 78.

More specifically, the end wall 40 of the cap 38 is shown formed with a second counterbored opening forming the debris collection compartment 82 in coaxially aligned surrounding relation with a forwardly projecting reduced end portion of the plug having a converging annular wall 84 of generally uniform but reduced thickness relative to that of portion 40A of the end wall 40 surrounding the terminal opening 78 in the cap 38.

The compartment 82 is of reduced diameter relative to the counterbored opening 74 but is considerably larger than both the maximum diameter of passageway 76 in the plug 72 and the end wall opening 78 in the cap 38. In addition, the inside surface 86 of the end wall portion 40A provides a forward wall for the compartment 82 and is desirably formed in axially forwardly spaced relation to the plug 72 such that any live round passing through the plug will blow out its restrictive annular wall 84 in a radial burst pattern extending at an angle of about 45° to the path of the bullet such that the fragments will be largely confined within the cap 38 of the adaptor 10. Any debris which escapes with a speed sufficient to be potentially lethal has been found to be discharged through the cap opening 78 in the general path of the exiting bullet.

In addition, this disclosed construction further eliminates any possible damage to the barrel lands (not shown) which has been found to be caused by gas erosion and heat expansion of the adapter parts during normal use in conventional adaptors which extend into the muzzle of the barrel. Such conventional adaptors have also been found to cause peening of the barrel lands due to physical attachment and removal of the adaptors to an operative position inside the muzzle of the barrel. Due to the disclosed construction wherein the plug 72 is in axially spaced relation to the muzzle of the barrel 12, such deleterious effects on the barrel 12 are minimized, while further minimizing any undesired deformation of the adaptor components even under extended periods of repeated usage. Moreover, any escape of gases between the plug 72 and the surrounding extension sleeve 14 is desirably accommodated by the end wall orifice 68 in the cap 38 which provides an auxiliary bleed directly to atmosphere.

If desired, an auxiliary radial opening may be formed in the cap 38 such as shown in broken lines at 88 in addition to or in lieu of the end wall orifice 68. Such auxiliary opening 68 or 88 serves not only to relieve any gases which may escape into the outer confines of the cap 38 surrounding the fitting 24 and extension sleeve 14, but additionally minimizes fouling by evacuation of gases and unburned powder and other particles carried thereby while providing added cooling of the components by rapid gas evacuation and realistic flash and sound simulation. The auxiliary radial opening 88 further minimizes any undesirable "blowback" of gases in a rearward direction through the rear opening in the cap 38 and for such purposes, one or more openings such as at 88 may be provided as desired.

It has also been found that the disclosed direct contact connection between the cap 38 and the plug 72 adjacent its orifice restriction 80 permits the cap 38 to serve as a heat sink to provide improved heat absorption and dissipation in good heat transfer relation to the plug 72 to reduce the surface temperature of the walls 84 surrounding the restriction 80 during sustained firing. The relatively large size of the cap 38 accordingly

acts to dissipate heat from the plug 72 to atmosphere. Such construction not only minimizes potential erosion of the orifice restriction 80 due to excessive thermal effects, resulting in progressively diminished back-pressure buildup and undesirable short-recoil malfunction, but also preserves a constant size restriction to ensure high velocity passage of the gases through the smoothly tapered orifice restriction 80 to further effect self-cleaning of the restriction itself.

A blank firing adaptor of the type shown in FIGS. 1-4 and constructed in accordance with this invention will be seen to be readily installed by first attaching the fitting 24 onto the muzzle of the firearm barrel 12 and then with the cross pin 42 in release position, the cap 38 is simply rammed rearwardly over the fitting 24 into telescoped assembled position with the fitting 24. The lock lever 50 is then rotated 180° to locked position to positively secure the adaptor 10 to the firearm. Removal of the adaptor 10 is readily accomplished by simply reversing the above-described procedure. It will be seen that when the cap 38 is rammed rearwardly into operative position during installation of the adaptor 10 onto the barrel 12, the relatively close fit between the plug 72 and the walls of the throat 20 automatically effects a cleaning operation to remove any undesired powder fouling.

Another embodiment of a blank firing adaptor of this invention is shown in FIGS. 5 and 6 wherein like numbers with a prefix "1" designate like parts corresponding to those described in the embodiment of FIGS. 1-4. A muzzle of a barrel 112 is shown with an extension sleeve or flash suppressor 114 threadably secured to the barrel 112 which has an axially extending bore 116. The muzzle end of bore 116 communicates with a tapered opening 118 formed within flash suppressor 114, and a pair of grooves 134, 136 circumferentially extend about the flash suppressor 114.

To eliminate forward discharge of burning gases, particularly during automatic firing, a wall 140 is shown closing off the front end of gas metering cap 138, and the hot gases of combustion enter a passageway 176 of a blind plug 172 which is sealed by a thin frangible central portion 140B of wall 140. The combustion gases expand in a controlled fashion through a restrictive annulus between a rear terminal portion of plug 172 and the surrounding reduced throat 120 of flash suppressor 114 while consistently providing the necessary pressure in the weapon's gas system for proper functioning. The pressure and velocity of the gases have been found to satisfactorily maintain the passageway 176 of plug 172 free of carbon deposit buildup while additionally effecting self-cleaning of the annulus between the flash suppressor throat 120 and plug 172. By allowing the gases of combustion to expand into a relatively large volume cavity between the plug 172 and the flash suppressor 114, the gases are rapidly dissipated preferably through multiple radially disposed ports such as at 178 in the side wall of cap 138 and through the open rear end of the cap 138. Accordingly, no possibility exists, even during an automatic mode of fire, for flame projection forwardly of the adaptor 110, which is commonly referred to as a so-called "torch effect" and which might burn a trainee during a training exercise. Moreover, the frangible central portion 140B of plug 172 is so designed that a minimum number of plug particles go down-range in the approximate path of the

bullet if live ammunition is accidentally fired while the adaptor 110 is installed.

By virtue of the above described construction, the gas system of the weapon is energized upon firing of a blank since plug 172 forms a gas muzzle trap within the cap 138 to effect recoil operation of the weapon, and gas release is achieved via the restrictive annulus at the throat 120 of the flash suppressor 114. As in the first embodiment of FIGS. 1-4, any possibility of damage to the muzzle of barrel 112 or the adaptor 110 during normal use is effectively eliminated. This desirable result is achieved by dimensioning the longitudinal length of plug 172 such that its rear portion is seated within the flash suppressor throat 120 in adjacent but axially forwardly spaced relation to the muzzle of barrel 112. Adaptor 110 may be of an all steel construction, e.g., or other suitable metal, and linear expansion or any other deformation caused by the hot combustion gases heating the weapon muzzle and adaptor 110 during use will be taken up in the gap between the muzzle of barrel 112 and adaptor plug 172, thereby avoiding any possibility whatsoever of the adaptor components becoming engaged and damaging any part of the weapon muzzle either during use or upon installation of the adaptor 110.

Quick and easy assembly and disassembly of the cap 138 on the flash suppressor 114 is achieved by a significantly simplified integral wire spring clip 189 shown having two arms 190, 190 interconnected by a bight portion 192 shown in locked position in FIG. 5 in engagement with an edge of a circular rear wall 194 of the cap 138, while arms 190, 190 will be understood to be in locking engagement with cap 138 and with diametrically opposed portions of the flash suppressor 114 within its groove 136. The wire spring clip arms 190, 190 are received for sliding movement in guideways 195, 196 formed in cap 138 and contained in a plane perpendicular to the longitudinal axis of cap 138. To secure the spring clip 189 against inadvertent disassembly from the cap 138, a roll pin 198 is fixed to the cap to project into guideway 195 for receipt within a notch 199 forming a reduced diameter portion intermediate the ends of arm 190.

With cap 138 aligned with flash suppressor 114 and with spring clip 189 in its release position (FIG. 6), the cap may be pushed rearwardly into position as shown in FIG. 5, and the spring clip then may be moved radially inwardly relative to the cap 138 and into locked position as seen in FIG. 5. In its locked position, bight portion 192 of spring clip 189 is snap locked over rear wall 194 of cap 138, and arms 190, 190 interlock cap 138 and flash suppressor 114. As a result, the blank firing adaptor 110 is firmly secured on barrel 112 against inadvertent or accidental release while at the same time permitting quick release and removal by simply pulling spring clip 189 radially outwardly of cap 138 into release position as shown in FIG. 6.

Referring now to FIG. 7, a front portion of cap 238 is shown which will be understood to be of a generally similar construction to that of the cap 138 in FIGS. 5 and 6 with like parts identified by the same numbers increased by 100. However, front wall 240 of cap 238 is modified to provide a configured front end portion defining a debris collection compartment 282 surrounding a forwardly projecting reduced end portion of plug 272 having a converging annular wall 284 terminating in a metering orifice restriction 280 of a predetermined

reduced size relative to passageway 276 of plug 272. As in the first embodiment shown in FIGS. 1-4, the metering orifice restriction 280 is suitable for functioning the rifle within its proper cyclic rate range in either automatic or semi-automatic modes of fire while yet permitting direct bleed-off of gases to atmosphere through a terminal opening 278 having a diameter equal to that of passageway 276 but of somewhat greater size than the bore of the weapon on which the adaptor 210 is installed. In FIG. 7, the opening 278 is defined by a washer 279 retained within the debris collection compartment 282 with the central opening of the washer 279 being coaxial with the passageway 276 formed in plug 272 which is intended to be mounted in concentric relation to the bore of the weapon on which adaptor 210 is installed. Accordingly, the modified embodiment of FIG. 7 effectively minimizes any possibility of secondary missile discharge if the blank firing adaptor 210 is inadvertently damaged by the firing of a live round.

The appearance of the adaptor of this invention is significantly different to insure that no trainee will unknowingly load live rounds in a rifle with the adaptor installed, and if desired, the exterior surface of the cap may even be provided with a conspicuous color, e.g., by providing a hard anodized red coating of the aluminum material to further minimize any risk of firing live rounds through the adaptor. The adaptor may be readily modified to be functionally compatible with a variety of firearms with which it is intended to be used and to realistically provide audible reports simulating the firing of live ammunition for use in tactical training, maneuvers and other applications such as in demonstrations. In addition to the aforementioned safety features and suitability for quick and easy installation and removal without tools, the lightweight rugged construction of the disclosed adaptor is readily suited for convenient, easy cleaning in the field. Moreover, the adaptor is capable of being manufactured and assembled in an economical construction requiring a minimum number of easily made parts.

As will be apparent to persons skilled in the art, various modifications, adaptations and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

I claim:

1. A blank firing adaptor for use with a gas operated firearm having a bore and surrounding barrel terminating in a muzzle having an axially extending opening generally aligned with the bore and diverging outwardly from a reduced throat, the throat being of enlarged size relative to that of the firearm bore and being positioned in adjacent but axially forwardly spaced relation to the firearm barrel, the adaptor comprising a cap attachable to the firearm barrel muzzle and having an end wall and a plug mounted within the cap to extend rearwardly of the end wall of the cap for forming a muzzle gas trap, the plug having a passageway extending through the plug with a passageway opening of a size at least equal to that of the firearm bore, the plug having a frangible reduced portion providing a metering orifice restriction in the passageway to the flow of gases therethrough for effecting operation of the firearm, the frangible reduced portion of the plug being of reduced thickness relative to the thickness of the end wall of the cap, the end wall of the cap being in axially forwardly spaced relation to the reduced portion of the

plug and forming a debris collection compartment within the cap adjacent the metering orifice restriction for entrapping debris upon firing of the live round through the cap.

2. The adaptor of claim 1 wherein the debris collection compartment is formed within the cap in communication with the passage, the debris collection compartment being of substantially enlarged size relative to the metering orifice restriction and disposed in surrounding relation thereto.

3. The adaptor of claim 1 further including an open-end fitting engageable with the muzzle of the firearm barrel in longitudinally secured relation thereto for supporting the cap on the muzzle, the cap being removably mounted in surrounding telescoped relation to the fitting, and lock means releasably securing the cap in surrounding telescoped assembly with the fitting.

4. The adaptor of claim 1 wherein the reduced portion of the passageway extending through the plug is formed by an apertured end wall at a forward end portion of the plug, the forward end portion of the plug being fixed within the cap with the apertured end wall of the plug being disposed inside the debris collection compartment of the cap.

5. A blank firing adaptor for use with a gas operated firearm having a bore and surrounding barrel terminating in a muzzle and comprising an open-ended fitting having muzzle engaging means for positioning the fitting on a firearm barrel muzzle and securing the fitting thereon against relative longitudinal movement, a generally cylindrical gas metering cap having an open end for receiving the fitting and manually releasable lock means carried on one of the cap and fitting members for cooperative locking engagement with the other of the cap and fitting members, the lock means being movable between a release position, permitting free sliding movement between the cap and the fitting, and a locked position for securing the cap and the fitting in telescoped assembly, the lock means including a cross pin supported in the cap for rotary movement between said locked position, wherein the cross pin is engageable with the fitting to physically block movement of the cap when it is in telescoped assembly with the fitting, and said release position wherein the cross pin is free of interference with the fitting to permit free sliding movement between the cap and the fitting.

6. The adaptor of claim 5 wherein the cap includes a gas passage extending therethrough in general alignment with a bore of the firearm barrel when the cap is mounted thereon, the size of the passage opening being at least equal to that of the firearm bore, the passage having a metering orifice restriction intermediate the ends of the passage, and wherein an enlarged debris collection compartment is formed within the cap in communication with the passage in adjacent surrounding relation to the metering orifice restriction for entrapping debris upon firing of a live round through the passage in the cap.

7. The adaptor of claim 5 wherein the cap includes a front wall having an opening therein, wherein an elongated plug is carried within the cap in fixed relation thereto and includes a longitudinally extending passageway generally aligned with the opening in the front wall of the cap, the opening in the front wall of the cap and the passageway in the plug both being of generally equal but slightly larger size than the bore of the firearm barrel, the plug being positioned within the fitting

in general alignment with the firearm bore in confronting forwardly spaced relation to the firearm barrel when the cap and fitting are mounted thereon in telescoped assembly, and wherein a metering orifice restriction is formed in the passageway of the plug.

8. The combination of claim 5 wherein the muzzle of the firearm barrel includes an extension sleeve having a circumferentially extending groove, and wherein the muzzle engaging means of the fitting includes a locking lug engageable within the groove of the extension sleeve.

9. The adaptor of claim 5 wherein the cross pin is supported for rotary movement within an opening extending transversely to a longitudinally extending axis of the cap, and wherein a manually operable lever is fixed to the cross pin for facile manipulation of the cross pin between locked and release positions for quick disconnect and reassembly of the cap and the fitting.

10. The adaptor of claim 7 wherein the cap includes a debris collection compartment therein generally surrounding the metering orifice restriction in the plug for entrapping debris upon firing of a live round through the cap.

11. The combination of claim 7 wherein the muzzle of the firearm barrel includes an extension sleeve secured thereon and including an opening having a necked-down throat slightly larger in size than the opening of the firearm bore, and wherein the plug includes a rear body portion engageable within the throat of the extension sleeve in adjacent but axially forwardly spaced relation to the firearm barrel.

12. The adaptor of claim 5 wherein the fitting includes a parti-cylindrical body mountable on the muzzle of the firearm barrel and having an arcuate rear shoulder engageable with the cross pin of the lock means, and wherein an elongated plug is carried within the cap in fixed offset relation to a major longitudinal axis of the cap for receipt within the muzzle of the firearm in general alignment with its bore when the cap and fitting are mounted on the firearm barrel in telescoped assembly, the plug serving to automatically align the cross pin in the cap with the arcuate rear shoulder of the fitting when the plug is positioned within the muzzle of the firearm.

13. The combination of claim 11 wherein rearward movement of the cap relative to the fitting toward telescoped assembly therewith effects seating engagement of the plug within the throat of the extension sleeve and automatic cleaning of any powder fouling therein.

14. The combination of claim 11 wherein the body portion of the plug is dimensioned and configured to conform to the opening of the extension sleeve and serves to seal its throat, and wherein an auxiliary orifice is formed in the cap to provide auxiliary gas relief around the plug.

15. A blank firing adaptor for use with a gas operated firearm having a barrel terminating in a muzzle and comprising a cap having a rear portion attachable in radially disposed relationship to the firearm muzzle, and means including a plug fixed to the front portion of the cap and having a frangible wall forming a muzzle gas trap within the cap for controlled gas restriction to effect recoil operation of the firearm with the wall being sufficiently thin to permit discharge of a bullet upon accidental firing of a live round through the adaptor, the plug being dimensioned to provide a rear terminal por-



tion thereon disposed forwardly of said rear portion of the cap so that the cap, when attached in operative position to the firearm muzzle, mounts the plug in adjacent but axially forwardly spaced relation to the firearm barrel.

16. The adaptor of claim 15 wherein the plug constitutes a tubular member fixed to and extending rearwardly from the front portion of the cap for concentric alignment with a bore of the firearm barrel when the cap is attached to the muzzle.

17. The adaptor of claim 16 wherein the front portion of the cap closes the forward end of the tubular plug and provides said frangible wall for the plug, wherein the cap further includes a generally cylindrical side wall in surrounding relationship to the plug, and wherein gas porting means are provided in the side wall of the cap.

18. The adaptor of claim 16 wherein the tubular plug defines an elongated gas passageway within the cap extending through the plug with the passageway being at least equal in diameter to that of the bore of the firearm barrel, and wherein the frangible wall of the plug is located in alignment with the passageway and is apertured to provide a portion of reduced cross sectional size providing a metering orifice restriction to the flow of gas therethrough.

19. The adaptor of claim 16 wherein the cap has a generally cylindrical body, and wherein the front portion of the cap has a forwardly tapered wall in spaced surrounding relation to the front end of the plug and defining a debris collection compartment for entrapping debris upon firing of a live round through the plug.

20. The adaptor of claim 19 wherein the plug is of an open ended tubular construction having a metering orifice therein provided by an apertured portion of the frangible wall of the plug to effect controlled gas restriction for recoil operation of the firearm.

21. The adaptor of claim 15 further including a wire spring clip mounted on the cap for movement between a release position, permitting free relative movement

between the cap and the firearm barrel muzzle, and a locked position for securing the cap and the firearm barrel in assembled fixed relation.

22. The adaptor of claim 21 wherein the firearm barrel muzzle includes an extension sleeve having a reduced internal throat portion and a groove circumferentially extending about the outside surface of the sleeve, wherein the cap is of a generally cylindrical shape in surrounding relation to the plug and the sleeve, wherein the plug is of a generally tubular construction with its rear terminal portion being receivable within the reduced throat portion of the sleeve and wherein the spring clip includes a pair of interconnected arm portions extending in a plane perpendicular to the longitudinal axis of the cap for selective engagement and disassembly relative to the groove of the extension sleeve on opposite diametrical sides of the sleeve.

23. A blank firing adaptor for use with a gas operated firearm having a bore and surrounding barrel terminating in a muzzle and comprising an open-ended having muzzle engaging means for positioning the fitting on a firearm barrel muzzle and securing the fitting thereon against relative longitudinal movement, a generally cylindrical gas metering cap having an open end for receiving the fitting, manually releasable lock means carried on one of the cap and fitting members for cooperative locking engagement with the other of the cap and fitting members, the lock means being movable between a release position, permitting free sliding movement between the cap and the fitting, and a locked position for securing the cap and the fitting in telescoped assembly, a longitudinally extending guide slot formed in one of the cap and fitting members, and a pin secured to the other of the cap and fitting members for movement within the guide slot limiting free sliding movement between the assembled cap and fitting members to longitudinal reciprocating movement.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,766,822

Dated October 23, 1973

Inventor(s) Nicholas Sophinos

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 12, line 21, after "open-ended" insert "--fitting--".

Signed and sealed this 19th day of February 1974.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents

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